

Teacher(s):

(Geometry)

Unit: Learning Focus 4.2 - Pythagorus and special right triangles Lesson:

Time: 9:30 - 11:30 am

Defining Success	OBJECTIVE: What will your students be able to do by the end of class?	
	GEOM .5D: Students will be able identify and apply patterns from right triangle to solve meaningful problems including special right triangles (45-45-90 and 30-60-90) and triangles whose sides are Pythagorean triples.	
	ASSESSMENT: How will you know concretely that all of your students have mastered the objective?	KEY POINTS: What three to five main ideas or steps will you emphasize in your lesson? May also include key questions to ask during instruction.

problems/Exit ticket. \triangle , right to ~~be able~~ find pattern 2 sides have to be known of a of the unknown side using right triangle & quadratic formula.

- What are the limitations of the Pythagorean rule?
- How does the perpendicular bisector of an equilateral triangle relate with the Pythagorean rule? *hypotenuse right*
- how does an isosceles triangle relate with the Quadratic formula or the Pythagorean rule?

Lesson Cycle	ENGAGE: Get the students' minds focused on the topic (short; question or picture)	MATERIALS
	"I have ...Who has?" Card game: Ask each group to find the pairs of card that match. The cards review Pythagorean Theorem concepts, and square roots studied in middle grades and Algebra 1.(From 4.2 Prerequisites/Background Knowledge)	Sketchpad software Game Cards
	EXPLORE: Provide students with a common experience	
	Geometry Sketchpad: Use the Quadratic program provided " Quadratic function machine" to:	
	<ul style="list-style-type: none"> Proof or counter proof that there are three consecutive integers that form a Pythagorean triple. Demonstrate a common "slope" or number students obtained 	
	EXPLAIN: Teach the concept. Should include interaction between teacher and students.	

through finding the heights of different equilateral triangles and isosceles right triangles.

the hypotenuse of the Quadratic function machine.

Explain:

$$x^2 + (x+1)^2 = (x+2)^2$$

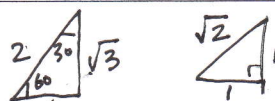
$$x^2 - 2x - 3 = 0$$

$$x = 3, -1$$

The only Pythagorean triple in consecutive sequence.

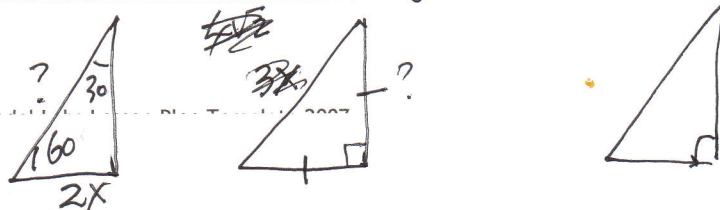
5 4 3

ELABORATE: Students apply the information learned in the Explain



EVALUATE: How will you know the students have learned the concept?

Exit ticket: using two special right triangles concepts learned to find one of the sides of two special right triangles.



Questioning and the 5E Lesson

Geometry

Subject/Lesson: _____

Objective: _____

Stage of 5E Lesson	Question	Bloom's Level
Engage Gets the students' minds focused on the topic.	the How do you use you use Pythagorean Thm? what when will you use it? and what was it?	<ul style="list-style-type: none"> <input checked="" type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create
Explore Provides students with a common experience.	What special constant number you always see in equilateral Δ ?	<ul style="list-style-type: none"> <input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create
Explain Teaches the concept with interaction between the teacher and students.	What kind of Pattern do you see and how you apply to other figures?	<ul style="list-style-type: none"> <input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create
Elaborate Provides opportunity for students to apply the concept in a new situation.	Known sides of a square to find the diagonal. What kind of property will the diagonal relate to the side?	<ul style="list-style-type: none"> <input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create
Evaluate Allows students to demonstrate understanding of the concept and facts.	Write a proof of a triangle theorem on the board by using quadratic equation. Will it be possible to be other number?	<ul style="list-style-type: none"> <input type="radio"/> Remember <input type="radio"/> Understand <input type="radio"/> Apply <input type="radio"/> Analyze <input type="radio"/> Evaluate <input type="radio"/> Create

Questioning and the 5E Lesson

Geometry

Subject/Lesson: _____

Objective: _____

Stage of 5E Lesson	Question	Bloom's Level
Engage Gets the students' minds focused on the topic.	1. What do you know about triangles? 2. The $30^\circ-60^\circ-90^\circ$ & $45^\circ-45^\circ-90^\circ$ special right triangles review radicals simplification.	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Explore Provides students with a common experience.	1. $\sqrt{8} = 4$? 2. How to simplify radicals.	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Explain Teaches the concept with interaction between the teacher and students.	Show that: 1. $30^\circ-60^\circ-90^\circ$ & $45^\circ-45^\circ-90^\circ$ triangles formulas.	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Elaborate Provides opportunity for students to apply the concept in a new situation.	Use similar triangles & special ($30-60-90$) to solve problems. (Geometric Mean)	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Evaluate Allows students to demonstrate understanding of the concept and facts.	1. if students can use special right triangles rules to solve questions instead of $a^2+b^2=c^2$ 2. triangles generations.	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create

Questioning and the 5E Lesson

(Geometry)

Subject/Lesson: Geometry: Pythagorean Theorem

Objective: Pythagorean Theorem


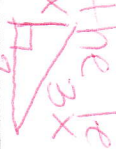
Stage of 5E Lesson	Question	Bloom's Level
Engage Gets the students' minds focused on the topic.	- What is the Pythagorean Theorem. What three consecutive numbers comply with the Pythagorean theorem?	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Explore Provides students with a common experience.	Explore with different sizes and types of right triangle (group), what pattern can you observe. These three consecutive integers always form a Pythagorean.	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Explain Teaches the concept with interaction between the teacher and students.	How can we connect the Pythagorean theorem to our prior knowledge of Quadratic equation?	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Elaborate Provides opportunity for students to apply the concept in a new situation.	Show that the Pythagorean theorem applies to all right angle triangles including special Right Angles. What are the properties of special Right triangles. What is/are the differences between SP LA and one LA.	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Evaluate Allows students to demonstrate understanding of the concept and facts.		<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create

Questioning and the 5E Lesson

Geometry

Subject/Lesson: GEOMETRY

Objective: PATTERNS WITH

Stage of 5E Lesson	Question	Bloom's Level
Engage Gets the students' minds focused on the topic.	What is the length of the third side of the triangle? 	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Explore Provides students with a common experience.	HOW CAN WE USE THE EQUILATERAL SLOPE NUMBER TO FIND THE HEIGHT OF A EQUILATERAL RIGHT TRIANGLE WITH SIDE LENGTH 100cm?	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Explain Teaches the concept with interaction between the teacher and students.		<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Elaborate Provides opportunity for students to apply the concept in a new situation.	What pattern do you notice between the leg length and the hypotenuse of a 45-45-90 triangle.	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create
Evaluate Allows students to demonstrate understanding of the concept and facts.	Given the following triangle, use the quadratic formula to find an expression for the length of the unknown side. 	<ul style="list-style-type: none"> Remember Understand Apply Analyze Evaluate Create

Analysis of a 5E Lesson

Subject/Lesson: GEOMETRY

Objective: PYTHAGOREAN THEOREM

Stage of 5E Lesson	Teacher Role	Student Role	Suggestions
Engage Gets the students' minds focused on the topic.	Introduce the topic by Teacher provides engaging activity to put the student in the mood. I have... Who has. ↓	making students recollect Students work in groups to match the pieces together in the activity. ↓	Teacher move round and listen to discussion going on in each group ↓
Explore Provides students with a common experience.			
Explain Teaches the concept with interaction between the teacher and students.	if at all possible 3 consecutive numbers to student they satisfy Pythagorean theorem ask student to prove or counter proof.	Students use Quadratic formula in three consecutive numbers using variable.	
Elaborate Provides opportunity for students to apply the concept in a new situation.	Write Tell student why the Pythagorean theorem does not always work with every three consecutive numbers.		
Evaluate Allows students to demonstrate understanding of the concept and facts.	Teacher provide Exit Ticket questions to gauge students understanding	Students work on set of questions that shows their understanding	

Nov 28
Feb 28

1492
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Analysis of a 5E Lesson

Subject/Lesson:

Geometry

Objective:

Stage of 5E Lesson	Teacher Role	Student Role	Suggestions
Engage Gets the students' minds focused on the topic.	<ul style="list-style-type: none"> provide students with supplies Remind the facilitator to keep group members on task 	<ul style="list-style-type: none"> group question with correct answer 	
Explore Provides students with a common experience.	<ul style="list-style-type: none"> Provide each group with a unique integer number 	<ul style="list-style-type: none"> Draw a equilateral triangle with the given side length Draw a isosceles right triangle with leg x and measure hypotenuse create a table with each groups results 	
Explain Teaches the concept with interaction between the teacher and students.	<ul style="list-style-type: none"> Teachers provide notes on special right triangles 	<ul style="list-style-type: none"> shade 	
Elaborate Provides opportunity for students to apply the concept in a new situation.	<ul style="list-style-type: none"> sketch facilitate the pattern 		
Evaluate Allows students to demonstrate understanding of the concept and facts.	<ul style="list-style-type: none"> Provide students with evaluate examples 	<ul style="list-style-type: none"> will calculate an expression for the unknown 3rd side of a right triangle with expression, 	

Analysis of a 5E Lesson

Greaney 1/15/08.

Subject/Lesson:

Greaney

Objective:

Stage of 5E Lesson	Teacher Role	Student Role	Suggestions
Engage Gets the students' minds focused on the topic.	Raise questions & problems.	What do I already know?	
Explore Provides students with a common experience.	As a facilitator	Act . Share ideas and supports judgement.	
Explain Teaches the concept with interaction between the teacher and students.	listens & builds upon discussion.	listens and tries to comprehend explanations offered by the teacher.	
Elaborate Provides opportunity for students to apply the concept in a new situation.	Use previously learned information as a vehicle to enhance additional learning.	Answers open-ended questions by using observations, evidence & previously accepted explanation.	
Evaluate Allows students to demonstrate understanding of the concept and facts.	Assess student's knowledge through the use of exit tickets.	Demonstrate knowledge & skills.	